CLAIMS

1. A tapered cylindrical roller bearing, the steel rollers (3) of which are held in a cage (4) between a cylindrical inner raceway (18), defined on a smooth surface in an external radial position on a steel inner ring (2), and a cylindrical outer raceway (10), defined on a surface in an internal radial position of a steel outer ring (1) and bordered by at least one annular lateral shoulder (11) projecting substantially radially inward on the outer ring (1), which is coaxial with the inner ring (2), with the raceways (10, 18) facing each other and with said annular shoulder (11),
characterized in that at least the rollers (3) are made of a deep-nitrided nitriding steel comprising, in percent by weight, around:

- 0.3% C,
- 3% Cr,
- 1% Mo,
- 0.2% V,
- 0.15% Ni,

produced by double vacuum smelting, and the white surface layer of nitrides of which has been completely removed from at least all the working faces (5, 6, 8) of the rollers (3) that come into contact with the rings (1, 2) and/or the cage (4).

2. The roller bearing as claimed in claim 1, characterized in that the depth of nitriding of the deep nitriding steel lies within a range extending from about 0.45 mm to about 0.75 mm.

3. The roller bearing as claimed in either of claims 1 and 2, characterized in that the deep-nitrided nitriding steel is a 32CDV13 steel.

4. The roller bearing as claimed in claim 3, characterized in that the 32CDV13 steel is of the

G.K.H.Y.W. grade of the French steelmaker Aubert & Duval.

5. The roller bearing as claimed in any one of claims 1 to 4, characterized in that at least one of the outer (1) and inner (2) rings is made of a conventional bearing steel of the 100C6 type.

6. The roller bearing as claimed in any one of claims 1 to 5, characterized in that at least one of the outer (1) and inner (2) rings is made of a conventional bearing steel of the M50 (or 80DCV40) type comprising, in percent by weight, around:

- 0.8% C,
- 4% Cr,
- 4% Mo,
- 1% V,
- 0.15% Ni,

and produced by double vacuum smelting and with a through-hardening heat treatment.

7. The roller bearing as claimed in any one of claims 1 to 6, characterized in that at least one of the outer (1) and inner (2) rings is made of a structural case-hardening steel of the M50NIL type comprising, in percent by weight, around:

- 0.12% C,
- 4% Cr,
- 4% Mo,
- 1.2% V,
- 3.5% Ni,

and produced by double vacuum smelting and with a thermochemical case-hardening treatment.

8. The roller bearing as claimed in any one of claims 1 to 7, characterized in that at least one of the outer (1) and inner (2) rings is made of a nitriding steel similar or identical to that of the rollers (3) and deeply nitrided with complete removal of the white

surface layer of nitrides over at least the entire surface (10, 12, 13; 18) of said ring (1, 2) that is intended to come into contact with the rollers (3) and/or the cage (4).

9. The roller bearing as claimed in any one of claims 1 to 8, characterized in that the rollers (3) and, where appropriate, the ring or rings (1, 2) made of deep nitriding steel have a surface Vickers hardness lying within a range extending from about 720 to about 850 under a load of 0.5 kg and a core Vickers hardness lying within a range extending from about 330 to about 420 under a load of 0.5 kg.

10. The roller bearing as claimed in any one of claims 1 to 9, characterized in that the cage (4) is a one-piece metal cage, with as many cells as there are rollers (3), each cell housing one of the rollers (3) respectively, said cage (4) being centered on the outer ring (1).

11. The roller bearing as claimed in claim 10, characterized in that the metal cage (4) is made of bronze or of a vacuum-smelted 40NCD7-type steel, with surface silvering at least in the cells.

12. The roller bearing as claimed in any one of claims 1 to 11, characterized in that the cylindrical outer raceway (10) is defined on the outer ring (1) between two annular lateral shoulders (11) projecting substantially radially inward.

13. The roller bearing as claimed in any one of claims 1 to 12, characterized in that each shoulder (11) has an internal face (12), turned toward the rollers (3), that has a small taper angle lying within a range extending from about 15′ to about 45′.

14. The roller bearing as claimed in any one of claims 1 to 13, characterized in that each shoulder (11) has a cylindrical surface (13), in an internal radial position, coaxial with the outer raceway (10) and forming a surface for centering the cage (4).

15. The roller bearing as claimed in any one of claims 1 to 14, characterized in that the ratio of the radial height of each shoulder (11) to the diameter of the rollers (3) lies within a range extending from about 0.29 to about 0.31.

16. The roller bearing as claimed in any one of claims 1 to 15, characterized in that the inner raceway (18) is defined on the inner ring (2) between two axial end portions (19) of said inner ring (2), each having a frustoconical external face (20) converging axially outward.